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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/086,537	03/04/2002	Herbert Thanner	66376-279-7	1049

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EXAMINER
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VIJAYAKUMAR, KALLAMBELLA M

ART UNIT	PAPER NUMBER
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1751

DATE MAILED: 02/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/086,537	Applicant(s) THANNER ET AL.	
	Examiner Kallambella Vijayakumar	Art Unit 1751	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 12/01/2004.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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**Detailed Action**

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The declaration under 37 CFR 1.132 filed 12/01/2004 is sufficient to overcome the rejection of claims 1-8, 10-14 and 18 under 35 USC 102(a) based upon Reiter et al.

Applicant's arguments with respect to claims 1-23 have been considered but are moot in view of the new ground(s) of rejection. Claims 1-23 are currently pending with the application.

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***Claim Rejections - 35 USC § 102***

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The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-11 and 15-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Saakarov et al, (IEEE Frequency Control Symposium, 1992, Pages 713-723).

Saakarov et al disclose monolithic filters comprising piezoelectric single crystal resonators of Langasite (LGS) having a cut with an excitable fundamental frequency and operating in a thickness shear mode with an electromechanical coupling coefficient ( $K_e$ ) ranging from 2.5% to 0% for the crystal cuts between  $-60^\circ$  to  $-90^\circ$  meets the limitations of instant claims 1-2, 9, 11 and 15-18 (Pg-713: Abstract; Page-714, LGS-Crystal Structure, Pg-715: Piezo-Prop; Pg-717, Fig-6).

With regard to the claims 3-6, 8 and 10, Saakarov et al further discloses an operational frequency range of 5 MHz to 18.5 MHz for the cut single crystal oscillator of, Y-cuts with an accuracy up to 5', frequency constant to be  $\pm 5$  kHz mm for a crystal cut, and a low variance of the frequency constant as a function of temperature between  $-200^{\circ}\text{C}$  to  $+100^{\circ}\text{C}$  (Page: 717, Col-1 and Fig-6; Page-718, Freq. Vs temp characteristics, Fig-7-8; Page-722: Conclusion). With regard to the treatment to the crystal in claim-7, the claims are drawn to the piezoelectric single crystal element itself.

All the limitations of the instant claims are met.

The reference is anticipatory.

Applicants argue that the prior art does not teach the recited limitation of an effective mechanical coupling factor between 0.05% and 3%, and it prefers an embodiment with Y-cut at angles near  $\phi = 0^{\circ}$  having a  $K_c$  of 15%. The office respectfully disagrees with the arguments by the applicants, because the Saakharov's data on  $K_c$  in Fig-6 (Pg-717) overlaps with the by the applicants values. A reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill the art, including nonpreferred embodiments. *Merck & Co. v. Biocraft Laboratories*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989).

2. Claims 1-2, 8-9, 11-14 and 18 rejected under 35 U.S.C. 102(b) as being anticipated by Philippot et al (J. Crystal Growth 1993, 130, PP 195-208).

Philippot et al discloses a  $\text{GaPO}_4$  piezoelectric single crystal element having low shear mode with an electromechanical coupling coefficient ( $K_c$ ) ranging from about 1%

to 0% for the crystal cuts between  $-65^{\circ}$  to  $-90^{\circ}$  meets the limitations of instant claims 1-2, 9, 11-14 and 18 (Pg 195, Abstract, Pg 201, Section 3.4; Pg, 203, Fig-16). With regard to the claim-8, the prior art show little thermal variations of resonance frequencies with temperature (Pg-205, Fig 20, 22; Pg-206, Fig. 23-24; Pg-207, Fig 25). All the limitations of the instant claims are met.

The reference is anticipatory.

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*Claim Rejections - 35 USC § 103*

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
1. Claim 19 rejected under 35 U.S.C. 103(a) as being unpatentable over Saakharov et al, (IEEE Frequency Control Symposium, 1992, Pages 713-723) as applied to claim 1 above, and further in view of Kochurikhin et al (J. Crystal Growth, 1997, 181, pp 452-454).

The disclosure by Saakharov et al on monolithic filters comprising cut LGS piezoelectric single crystal resonators as set forth in Rejection-1 under 35 USC 102(b) is herein incorporated.

Saakharov et al do not disclose a piezoelectric single crystal element of cut strontium-gallium-germanate per the claim-19. However, the prior art disclosure is suggestive of a strontium-gallium-germanate piezoelectric element (Pg 722, Conclusion).

In the analogous art, Kochurikhin et al disclose the growth and piezoelectric properties of strontium-gallium-germanate (SGG), wherein the piezoelectric properties of SGG surpassed that for LSG (Pg 454, Col-1, Para; Col-2, Table-2).

It would have been obvious to a person of ordinary skill in the art to combine the teachings of Saakharov et al and Kochurikhin et al, and optimize the cuts for the strontium gallium germanate piezoelectric crystal to benefit from a piezoelectric element with wide range of applications and with reasonable expectation of success, because the prior art in combination suggest the claimed piezoelectric element.

2. Claims 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Philippot et al (J. Crystal Growth 1993, 130, PP 195-208).

The disclosure by Philippot et al on the GaPO<sub>4</sub> piezoelectric single crystal element as set forth in Rejection-2 under 35 USC 102(b) is herein incorporated.

Philippot et al is silent about specific steps involved in manufacturing the piezoelectric single crystal element per the instant claims.

However, Philippot et al disclose making of GaPO<sub>4</sub> single crystals, forming an element with electroded plate and measuring the piezoelectric properties of the oriented

cut crystals (Pg 204, Fig-19), whereby forming an element by cutting the single crystal and applying the electrodes to its surface per claims 20-21 would have been obvious steps. With reference to heating the crystal element per claims 22-23, the prior art discloses measuring the piezoelectric properties to 150°C (Pg 206, Fig 23-24), whereby heat treatments per the claims would have been obvious.

### *Conclusion*

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kallambella Vijayakumar whose telephone number is 571-272-1324. The examiner can normally be reached on M-Th, 07.00 - 16.30 hrs, Alt. Fri: 07.00-15.30 hrs.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Yogendra Gupta can be reached on 571-272-1316. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1751

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMV  
February 02, 2005.



2-3-05  
GREGORY WEBB  
PRIMARY EXAMINER